More Problems with 2 Variables – $Ax + By = C$

For each problem:

a) Define your variables: use x for the first quantity described and y for the second.
b) Build one equation representing the situation. Express it in the form $Ax + By = C$.
c) Find the x-intercept algebraically by substituting y = 0.
d) Find the y-intercept algebraically by substituting x = 0.
e) Sketch the linear function using the two intercepts and clearly identify the intercepts.
f) Label both axes.
g) Solve each problem algebraically.
h) Plot each solution and label them on your graph.

Mild

1. Students sell cheese pizzas for $10 each and pepperoni pizzas for $12 each. The fundraiser collects exactly $240 from pizza sales.
   a) If 12 cheese pizzas are sold, how many pepperoni pizzas are sold?
   b) If 5 pepperoni pizzas are sold, how many cheese pizzas are sold?

2. The school cafeteria sells sandwiches for $5 each and drinks for $2 each. It collects exactly $100 from these sales at lunch.
   a) If 12 sandwiches are sold, how many drinks are sold?
   b) If 15 drinks are sold, how many sandwiches are sold?

3. A student prepares a snack mix with almonds costing $8 per kilogram and raisins costing $4 per kilogram. The ingredients cost exactly $80 in total.
   a) If 4 kg of almonds are used, how many kilograms of raisins are used?
   b) If 6 kg of raisins are used, how many kilograms of almonds are used?

Medium

4. At the school book fair, hardcovers cost $18 each and paperbacks cost $10 each. A customer spends exactly $360 on books.
   a) If 5 hardcovers are purchased, how many paperbacks are purchased?
   b) If 18 paperbacks are purchased, how many hardcovers are purchased?

5. A school theatre sells student tickets for $8 each and adult tickets for $14 each. It collects exactly $224 from ticket sales.
   a) If 7 student tickets are sold, how many adult tickets are sold?
   b) If 8 adult tickets are sold, how many student tickets are sold?

6. A farmer is fencing a rectangular pasture. Wire costs $2.50 per meter, and the total cost of wire is exactly $600. The perimeter is twice the length plus twice the width.
   a) If the pasture is 50 m long, how wide is it?
   b) If the pasture is 40 m wide, how long is it?

Spicy

7. A taxi ride costs $4 to start, plus $2.25 per kilometre travelled and $0.50 per minute spent waiting in traffic. One ride costs exactly $49.
   a) If the taxi travels 8 km, how many minutes does it spend waiting?
   b) If the taxi spends 18 minutes waiting, how many kilometres does it travel?

8. An online store sells T-shirts for $25 each and hoodies for $45 each. The store takes 10% off the entire order. After the discount, a customer pays exactly $810.
   a) If the customer buys 9 T-shirts, how many hoodies are purchased?
   b) If 10 hoodies are purchased, how many T-shirts are purchased?

9. A community hall charges a flat $30 booking fee, plus $6 per chair and $9 per table. A group pays exactly $300 for its rental.
   a) If the group rents 15 chairs, how many tables does it rent?
   b) If the group rents 10 tables, how many chairs does it rent?

Extra Spicy

10. A fitness studio charges $40 for a standard membership and $55 for a premium membership. Each new membership also requires its own $30 sign-up fee. The studio collects exactly $3,570 from first-month memberships and fees.
    a) If 17 standard memberships are purchased, how many premium memberships are purchased?
    b) If 14 premium memberships are purchased, how many standard memberships are purchased?

11. A copy shop charges $0.12 per black-and-white page and $0.35 per colour page, plus a one-time $5 service fee. The student council pays exactly $47 for an order.
    a) If 70 black-and-white pages are printed, how many colour pages are printed?
    b) If 60 color pages are printed, how many black-and-white pages are printed?

12. An aquarium designer purchases gravel costing $2.50 per kilogram and decorative stones costing $3.75 per kilogram. A flat $15 delivery fee is added. The total bill is exactly $165.
    a) If 15 kg of gravel are purchased, how many kilograms of decorative stones are purchased?
    b) If 10 kg of decorative stones are purchased, how many kilograms of gravel are purchased?